



**City of New Braunfels, Comal County, Texas  
Cooperating Technical Partner  
Mapping Activity Statement**

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## **Agreement 1 - Hydrologic and Hydraulic Analyses and Floodplain Mapping Using Updated Topographic Data**

In accordance with the Cooperating Technical Partner (CTP) Memorandum of Agreement dated May 31, 2001, between the City of New Braunfels, Comal County, Texas and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement Number 1 is as follows:

- 1. Objective and Scope:** The objective of this Mapping Activity is to redelineate detailed floodplain boundaries along previously mapped streams and creeks in the City of New Braunfels, Texas and its extraterritorial jurisdiction. Hydrologic analyses will be completed for approximately 214 square miles of drainage area, and hydraulic analyses and floodplain mapping will be completed for approximately 40 linear miles of flooding. The streams included in this activity are:

- Guadalupe River
- Comal River
- Dry Comal Creek
- Bleiders Creek
- North Tributary to the Guadalupe River
- South Tributary of the Guadalupe River

The City of New Braunfels will prepare draft digital Flood Insurance Rate Maps (DFIRMs) for FEMA. It is anticipated that FEMA will then produce final DFIRMs for all affected panels located within the corporate boundaries of the City. The draft DFIRMs and the supporting data will be prepared using GIS-based hydrologic and hydraulic modeling and mapping techniques.

In addition the City will prepare Floodplain delineation work maps for those areas of the study that are located between the city's corporate boundary and the city's extra-territorial jurisdiction (ETJ) boundary, as well as the zones of transition that are beyond the ETJ. These areas lie within the jurisdictions of Comal County and Guadalupe County. Therefore, the work maps, hydrologic and hydraulic analysis will be given to the respective county flood plain administrators for their concurrence prior to our submittal to FEMA.

**Period of Performance:** This Mapping Activity will begin on October 1, 2001 and will be completed no later than September 30, 2002. This Mapping Activity may be terminated at the option of FEMA or the City of New Braunfels, Comal County, Texas in accordance with the provisions of the May 31, 2001, CTP Memorandum of Agreement.

## 2. Funding/Cost-Sharing:

### 3. Standards: The following standards and documents are relevant to this Mapping Activity:

- Detailed hydrologic and hydraulic analyses and floodplain mapping will follow the standards set forth in FEMA 37, *Guidelines and Specifications for Study Contractors* (January 1995), and Title 44 of the Code of Federal Regulations (CFR), Part 65. FEMA 37 is available at FEMA's Web site at [http://www.fema.gov/mit/tsd/EN\\_reg.htm](http://www.fema.gov/mit/tsd/EN_reg.htm). Title 44 of the CFR is available at FEMA's Web site at [www.access.gpo.gov/cgi-bin/cfrassemble.cgi?title=199944](http://www.access.gpo.gov/cgi-bin/cfrassemble.cgi?title=199944).
- Computer models used for hydrologic and/or hydraulic analyses will meet the requirements of 44 CFR 65.6(a)(6) and be on FEMA's *Numerical Models Accepted by FEMA for NFIP Usage* ([http://www.fema.gov/mit/tsd/EN\\_mod1.htm](http://www.fema.gov/mit/tsd/EN_mod1.htm)).
- Topographic mapping used to delineate floodplains and floodways will be of adequate scale and topographic definition to provide reasonable accuracy. Planimetric features will be compatible with the base map (with respect to horizontal accuracy) selected by FEMA for Digital FIRM production. Topographic mapping taken from aerial photogrammetry or surveys will comply with the requirements of Appendix 4 of FEMA 37. The selection of the topographic mapping source to be used will be coordinated with the FEMA Regional Project Officer prior to analysis and mapping.
- Any levee or dike systems to be shown on the community's FIRM as providing protection from the 1% annual chance flood will comply with the requirements of 44 CFR 65.10. Chapter 7 of FEMA 37 provides guidelines for evaluating levee and dike systems.

- Flood elevations and floodplain and floodway boundaries will reasonably tie in to non-revised information in accordance with 44 CFR 65.6(a)(2). For the purpose of this activity statement these areas are referred to as transition areas.
  - The floodway will be established in accordance with 44 CFR 65.7, as well as any applicable state and/or community requirements.
  - Digital mapping will comply with the requirements of Chapter 9 and Appendix 7 of FEMA 37.
  - Automated data processing and modeling algorithms for GIS-based modeling and mapping will be documented and provided to FEMA to ensure that they are consistent with the standards outlined above. Digital data sets (such as elevation, basin, or land use data) will be documented and provided to FEMA for approval prior to performing the analysis to ensure that they meet minimum requirements. If non-commercial (i.e., custom developed) software is used for the analysis, then full user documentation, technical algorithm documentation, and the software will be provided to FEMA for review prior to performing the scope of work.
  - Digital Elevation Models (DEMs) and field survey data will meet vertical accuracy requirements contained in Appendix 4 of FEMA 37.
4. **Products:** The City of New Braunfels, Comal County, Texas will make available items outlined in Chapter 11 of FEMA 37 in the Technical Support Data Notebook (TSDN) format. These include:
- Digital 1% and 0.2% annual chance floodplain and floodway boundaries;
  - Digital profiles of the 10%, 2%, 1%, and 0.2% annual chance water-surface elevations, representing existing conditions;
  - Flood Insurance Study (FIS) report;
  - Floodway data tables;
  - Digital copies of all hydrologic and hydraulic modeling (input and output files); and
  - All back-up data used in the analyses or mapping.

For GIS-based modeling and mapping, the City of New Braunfels, Comal County, Texas will deliver all digital input and output data, intermediate data processing products, GIS data layers, and final products in the format of the Digital Flood Insurance Rate Map (DFIRM) database structure.

5. **Schedule and Milestones:**

**Milestone 1 (Scoping Phase):** Products for the first milestone to be provided to the FEMA Project Officer include:

- Annotated copies of effective FIRMs depicting limits of proposed study.
- Documentation of the proposed source of topographic data, scale, contour interval, source/methodology, date of survey/data collection, vertical and horizontal datums,

and comparison of planimetric features with the DFIRM base map selected by FEMA for DFIRM production.

- A written summary of the initial data research, proposed analysis methodologies, and a work plan.
- Documentation of digital data sets to be used (such as elevation, basin, and land use data). Full user documentation, technical description of methodologies and algorithms, and a copy of the source codes and custom-developed software applications for GIS-based modeling will also be provided.
- Copies of topographic maps depicting proposed cross section locations.

**Milestone 2 (Hydrology Phase):** Products for the second milestone to be provided to the FEMA Project Officer include draft hydrologic analyses in accordance with the TSDN format.

**Milestone 3 (Hydraulics Phase):** Products for the third milestone to be provided to the FEMA Project Officer include the hydraulic models and sample floodplain mapping in accordance with TSDN format.

**Milestone 4 (Final Products):** Final products to be provided to the FEMA Project Officer include:

- The completed TSDN and accompanying data containing the information outlined in Section 5 of this Mapping Activity Statement.
- A QA/QC report documenting the results of the independent review of all computational and data processing procedures.

Final products will be made available in accordance with the Period of Performance described in Section 2 of this Mapping Activity Statement and per the following anticipated Milestone schedule (Table 2).

TABLE 2  
CTP Milestone Schedule  
Mapping Activity Statement

Milestone	Description	Anticipated Delivery Date
No. 1 Scoping Phase	<p>Annotated copies of effective FIRMs depicting limits of proposed study</p> <p>Documentation of the proposed source of topographic data and comparison of planimetric features with the DFIRM base map selected</p> <p>Written summary of initial data research, proposed analysis methodologies, and a work plan</p> <p>Documentation of digital data sets to be used</p> <p>Copies of topographic maps depicting proposed cross section locations</p>	January 21, 2002

No. 2 Hydrology Phase	Draft hydrologic analyses	April 15, 2002
No. 3 Hydraulics Phase	Hydraulic models and sample floodplain mapping	June 17, 2002
No. 4 Final Products	Completed TSDN and accompanying data A QA/QC report documenting the results of the independent review of all computational and data processing procedures	July 29, 2002

**6. Certification:** The following certifications apply to this Mapping Activity (as appropriate):

- Hydrologic and/or hydraulic analyses and data will be certified by a registered Professional Engineer or Licensed Land Surveyor in accordance with 44 CFR 65.6(f).
- Topographic information will be certified by a registered Professional Engineer or Licensed Land Surveyor in accordance with 44 CFR 65.5(c).
- If fill is to be considered in the mapping to raise land areas to or above the 1% annual chance flood elevation, certification of the fill will be provided in accordance with 44 CFR 65.5(a)(6) by the community's NFIP permit official, a registered Professional Engineer, or a Licensed Land Surveyor.
- Any levee systems to be accredited as discussed in Section 4 of this Mapping Activity Statement will be certified in accordance with 44 CFR 65.10(e).

**7. Technical Assistance and Resources:** The City of New Braunfels, Comal County, Texas may obtain copies of FEMA-issued Letters of Map Change (LOMCs), archived engineering back-up data, and data collected as part of the Mapping Needs Assessment Process from FEMA's Mapping Coordination Contractor (MCC). The MCC may be contacted at 1-877 FEMA MAP (1-877-336-2627). General technical and programmatic information, such as FEMA 265, the Quick-2 computer program, and the MT-2 forms, can be downloaded from FEMA's Flood Hazard Mapping Web site ([www.fema.gov/mit/tsd/](http://www.fema.gov/mit/tsd/)). Specific technical and programmatic support may be provided through FEMA's MCC; such assistance should be requested through the FEMA MCC Project Officer specified in Section 12 of this Mapping Activity Statement.

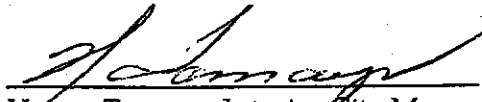
The City of New Braunfels, Comal County, Texas may also consult with the FEMA Project Officer to request support in the areas of selection of data sources, digital data accuracy standards, assessment of vertical data accuracy, data collection methods or sub-contractors, and GIS-based engineering and modeling training.

- 8. Contractors:** The City of New Braunfels, Comal County, Texas has entered into an agreement with CH2M HILL, Inc. to conduct the modeling and mapping activities described in this activity statement. Procurement of subcontractors using Federal funds provided as part of this Mapping Activity will comply with the requirements of 44 CFR 13.36.
- 9. Quality Assurance/Quality Control (QA/QC) Procedures:** The City of New Braunfels, Comal County, Texas will undertake internal QC reviews to ensure that the products described under Section 5 of this Mapping Activity Statement conform with the standards outlined under Section 4 of this Mapping Activity Statement For GIS-based, automated

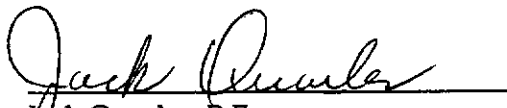
modeling, QA/QC activities will ensure automated calculations are reasonable and in compliance with standard flood modeling and mapping approaches. The City of New Braunfels, Comal County, Texas will document internal QA/QC procedures to ensure all calculations and data processing were reviewed.

10. **Reporting:** Reporting requirements will be in accordance with Agreement Articles V & VI.
11. **Points of Contact:** The FEMA Regional Project Officer is Jack Quarles, P.E., and the CTP Project Manager is Mike Short, P.E. Project Consultant is Rick Myrick with CH2M Hill, Inc. If it is necessary, the assistance of FEMA's MCC should be requested through the FEMA Regional Project Officer, Jack Quarles, P.E.

Each party has caused this Mapping Activity Statement to be executed by its duly authorized representative.

  
Hector Tamayo, Interim City Manager  
City of New Braunfels, Texas

Sep 12, 2001  
Date

  
Jack Quarles, P.E.  
Central Project Manager  
Federal Emergency Management Agency

9-12-01  
Date